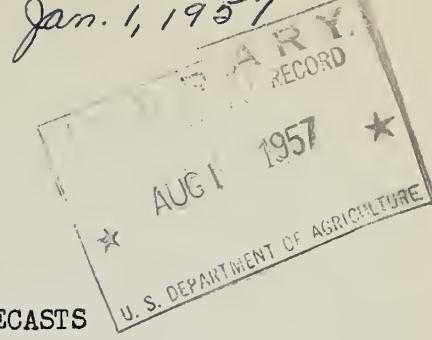


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FEDERAL - STATE COOPERATIVE
SNOW SURVEYS and WATER SUPPLY FORECASTS

for

MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared by:

A. R. Codd
Hydraulic Engineer
Soil Conservation Service

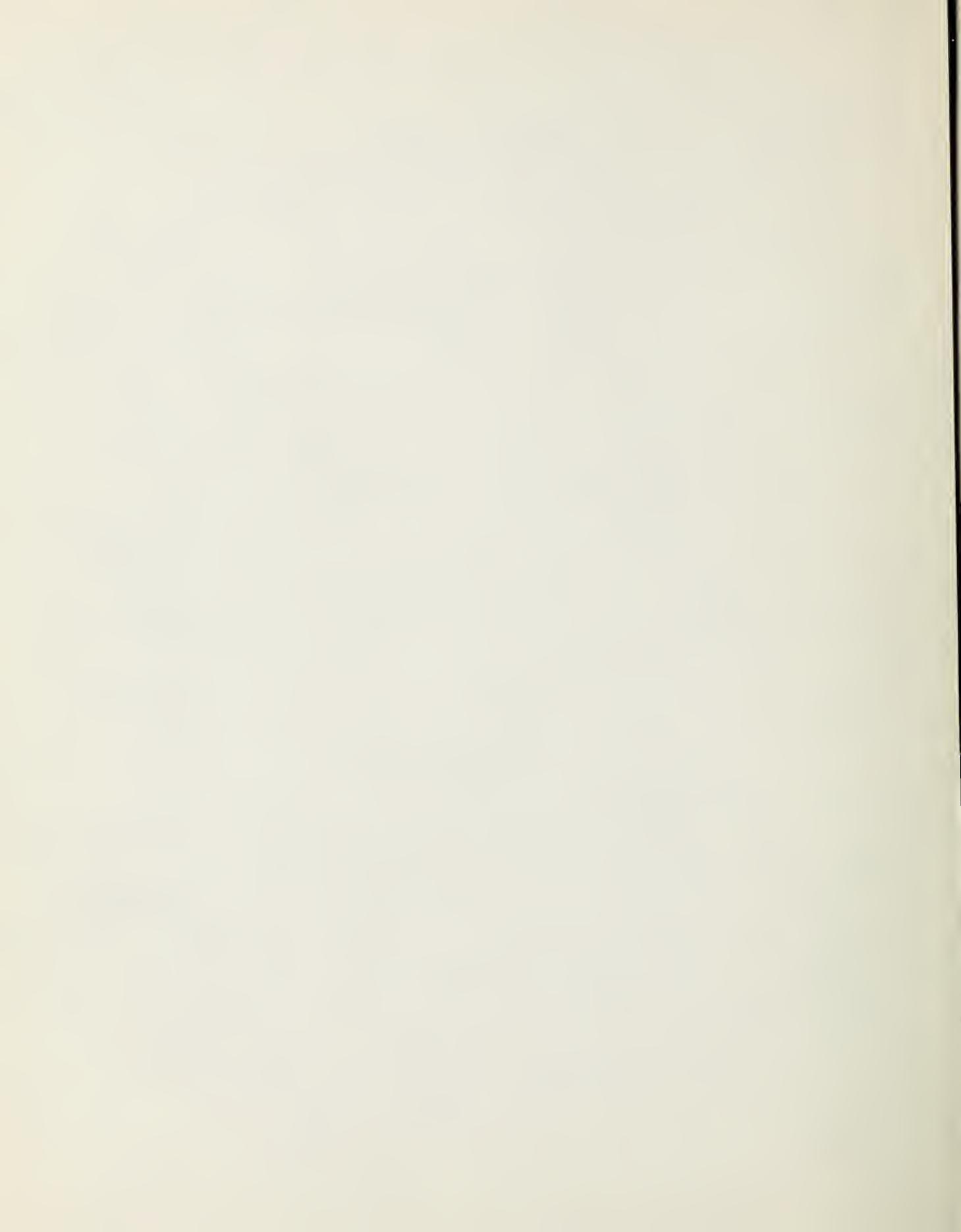
and
O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

Soil Conservation Service
U. S. Department of Agriculture
and
Montana Agricultural Experiment Station
Bozeman, Montana

Report issued by:

Truman C. Anderson
State Conservationist
of Montana

M. M. Kelso, Director
Montana Agricultural
Experiment Station



WATER SUPPLY OUTLOOK
from
SNOW SURVEYS
January 1, 1957

MISSOURI BASIN

The 1957 January first snow-pack in the higher elevations is average or better, with the lower elevation courses showing considerably below average. In general, this year's snow-pack is roughly 75 per cent of last year and about twice that of 1955.

This year the Upper Yellowstone River is covered with a snow-pack slightly below average. This year's pack is about twice that of 1955 and about a third less than last year.

COLUMBIA BASIN

In the Flathead River Basin the 1957 January first snow-pack is considerably lighter than 1956 and about 20 per cent less than the average of a short record. Only six courses were measured this season. This year's snow-pack is considerably better than January, 1955. Fall (Sept-Nov) precipitation was below average by 1.78 inches with close to average precipitation during December.

The 1957 January snow-pack on the Clark Fork Basin is only 58 per cent of last year's pack, and about 75 per cent average. The 1955 January snow-pack was considerably less than this year. Fall (Sept-Nov) precipitation this year was 1.54 inches less than average, with close to normal precipitation during December.

MONTANA SNOW SURVEYS - JANUARY 1, 1957

| MISSOURI BASIN DRAINAGE BASIN AND SNOW COURSE | No. | Elev. | Date of Survey | 1957 Snow Depth (In.) | Water Content (In.) | SNOW COVER MEASUREMENTS | | | | Total Years of Record |
|--|-------|-------|----------------------|--------------------------------|---------------------------|-------------------------|------|-------------------------------|------------------------------|--------------------------------|
| | | | | | | 1956 | 1955 | 15-Year Average 1938-52 | Past Record Water Content | |
| <u>JEFFERSON RIVER</u> | | | | | | | | | | |
| (Rock-Beaverhead) | | | | | | | | | | |
| *Kilgore | 11E12 | 6200 | 1/2 | 20 | 3.8 | 3.6 | - | 4.6 | 17 | |
| *Camp Creek | 12E3 | 6800 | 1/7 | 27 | 3.5 | 4.5 | - | 4.0* | 19 | |
| (Big Hole) | | | | | | | | | | |
| Gibbons Pass | 13D2 | 7100 | 12/31 | 42 | 11.2 | 19.5 | 5.5 | 11.2* | 7 | |
| <u>MADISON RIVER</u> | | | | | | | | | | |
| Hebgen | 11E5 | 6500 | 1/2 | 31 | 6.6 | 7.1 | 1.8 | 5.6 | 22 | |
| W. Yellowstone | 11E7 | 6700 | 1/2 | 24 | 5.6 | 8.9 | 2.1 | 4.1* | 19 | |
| 21-Mile | 11E6 | 7150 | 1/3 | 35 | 9.0 | 15.0 | 3.0 | 7.7* | 18 | |
| **Big Springs | 11E9 | 6500 | 1/29 | 37 | 9.5 | 11.8 | 3.3 | 7.4 | 21 | |
| **Island Park | 11E10 | 3600 | 12/30 | 31 | 7.2 | 9.0 | 2.4 | 6.0 | 21 | |
| **Valley View | 11E8 | 6500 | 12/30 | 30 | 6.7 | 9.7 | 1.2 | 5.2* | 20 | |
| Norris Basin | 10E2 | 7500 | 12/31 | 21 | 4.9 | 7.7 | - | 3.6* | 3 | |
| <u>GALLATIN RIVER</u> | | | | | | | | | | |
| 21-Mile | 11E6 | 7150 | 1/3 | 35 | 9.0 | 15.0 | 3.0 | 7.7* | 18 | |
| <u>MISSOURI RIVER MAIN STEM</u> | | | | | | | | | | |
| Chessman Res. | 12C5 | 6200 | 12/31 | 0.5 | 0.1 | 3.6 | 0.9 | 2.1 | 21 | |
| Tenmile, Lower | 12C2 | 6250 | 12/28 | 10 | 2.2 | 5.4 | 1.5 | 2.8 | 21 | |
| Tenmile, Middle | 12C3 | 6800 | 12/28 | 16 | 3.9 | 8.3 | 2.7 | 5.0 | 22 | |
| Tenmile, Upper | 12C4 | 8000 | 12/28 | 20 | 5.2 | 9.8 | 3.7 | 6.5 | 22 | |
| (Marias River) | | | | | | | | | | |
| Marias Pass | 13A5 | 5250 | 1/2 | 30 | 8.4 | 8.8 | 4.2 | 7.8 | 22 | |
| <u>UPPER YELLOWSTONE</u> | | | | | | | | | | |
| Canyon | 10E3 | 7750 | 12/31 | 29 | 6.5 | 13.5 | 3.8 | 7.1* | 11 | |
| Cooke City | 10D7 | 7400 | 12/30 | 19 | 3.5 | 5.9 | 3.2 | 4.5* | 10 | |
| Lake Camp | 10E4 | 7850 | 1/1 | 17 | 3.4 | 10.2 | 1.8 | 5.0* | 8 | |
| **Astor Creek | 10E8 | 7700 | 12/31 | 40 | 11.3 | 27.3 | 6.4 | - | 5 | |
| **Tom Thumb Summit | 10E7 | 7900 | 12/31 | 30 | 8.3 | - | - | 13.6* | 5 | |
| <u>LOWER YELLOWSTONE (Shoshone River)</u> | | | | | | | | | | |
| East Entrance | 10E6 | 7000 | 12/29 | 24 | 5.5 | 6.2 | 1.3 | - | 3 | |
| Sylvan Pass | 10E5 | 7100 | 12/28 | 27 | 6.6 | 10.3 | 2.4 | - | 3 | |

*Average is for less than 15 years of record in the 1938-52 period.

**Adjacent Basin.

MONTANA SNOW SURVEYS - JANUARY 1, 1957

| COLUMBIA BASIN DRAINAGE BASIN AND SNOW COURSE | No. | Elev. | Survey | SNOW COVER MEASUREMENTS | | | | Total Years of Record | | |
|--|-------|-------|--------|-------------------------|--------------------------------|---------------------------|-------------------------------|--------------------------------|----|--|
| | | | | Date of Survey | 1957 Snow Depth (In.) | Water Content (In.) | Past Record Water Content | | | |
| | | | | | 1956 | 1955 | 15-Year Average 1938-52 | | | |
| <u>FLATHEAD RIVER</u> | | | | | | | | | | |
| Coyote Hill | 13B10 | 4200 | 1/3 | 19 | 4.8 | 7.0 | 2.8 | 8.0* | 5 | |
| Desert Mountain | 13A2 | 5600 | 1/6 | 30 | 6.4 | 8.5 | 2.7 | 7.2* | 7 | |
| Marias Pass | 13A5 | 5250 | 1/2 | 30 | 8.4 | 8.8 | 4.2 | 7.8 | 22 | |
| Spotted Bear Mt. | 13B2 | 7000 | 1/4 | 25 | 5.9 | 7.9 | - | - | 1 | |
| Trout Lake | 13A12 | 3600 | 1/3 | 23 | 4.9 | 6.6 | - | 13.3* | 2 | |
| Twin Creeks | 13B11 | 3580 | 1/3 | 18 | 3.5 | 4.8 | - | - | 1 | |
| <u>CLARK FORK BASIN</u> | | | | | | | | | | |
| Coyote Hill | 13B10 | 4200 | 1/3 | 19 | 4.8 | 7.0 | 2.8 | 8.0* | 5 | |
| Chessman Res. | 12C5 | 6200 | 12/31 | 0.5 | 0.1 | 3.6 | 0.9 | 2.1 | 21 | |
| Lubrecht Forest #6 | 13C8 | 5400 | 1/2 | 4.0 | 1.1 | 3.7 | 0.8 | 4.0* | 6 | |
| Storm Lake #2 | 13C7 | 7780 | 1/4 | 27 | 6.0 | 10.6 | - | - | 1 | |
| Tenmile, Lower | 12C2 | 6250 | 12/28 | 10 | 2.2 | 5.4 | 1.5 | 2.8 | 21 | |
| Tenmile, Middle | 12C3 | 6800 | 12/28 | 16 | 3.9 | 8.3 | 2.7 | 5.0 | 22 | |
| Tenmile, Upper | 12C4 | 8000 | 12/28 | 20 | 5.2 | 9.8 | 3.7 | 6.5 | 22 | |
| **Lookout | 15B2 | 5250 | 1/2 | 53 | 15.6 | 27.0 | 10.9 | 21.1* | 7 | |
| TV Mountain | 14B1 | 6800 | 12/31 | 31 | 8.2 | - | - | - | 1 | |
| <u>BITTERROOT BASIN</u> | | | | | | | | | | |
| Gibbons Pass | 13D2 | 7100 | 12/31 | 42 | 11.2 | 19.5 | 5.5 | 12.0* | 7 | |

*Average is for less than 15 years of record in the 1938-52 period.

**Adjacent Basin.

STATUS OF RESERVOIR STORAGE
MISSOURI RIVER IN MONTANA
January, 1957

| BASIN & STREAM | RESERVOIR | USABLE CAPACITY 1000's AF | THOUSAND ACRE FEET IN STORAGE | | | 15-Yr.Avg. 1938-52 |
|--|-----------------|---------------------------------|-------------------------------|---------|---------|-----------------------|
| | | | ABOUT JANUARY FIRST 1957 | 1956 | 1955 | |
| <u>MISSOURI RIVER BASIN</u> | | | | | | |
| Beaverhead | Lima | 84.00 | 8.23 | 18.18 | 11.75 | 36.645* |
| Ruby River | Ruby | 38.85 | - | - | - | - |
| Madison River | Hebgen Lake | 345.00 | 157.1 | 184.90 | 167.50 | 241.652 |
| Madison River | Ennis Lake | 41.00 | 38.35 | 31.70 | 38.16 | 34.123 |
| Hyalite Creek | Middle Creek | 8.03 | 2.45 | 3.06 | 4.23 | 3.690* |
| Missouri River | Canyon Ferry | 2,043.00 | 1,742.0 | 1,646.0 | 1,311.0 | - |
| Missouri River | Hauser & Helena | 62.50 | 61.94 | 60.18 | 55.09 | 46.11 * |
| Missouri River | Lake Helena | 10.45 | 10.24 | 9.62 | 7.90 | 6.23 * |
| Missouri River | Holter Lake | 81.92 | 73.97 | 50.58 | 62.19 | 58.44 |
| N. Fk. Sun River | Gibson | 105.00 | 35.04 | 69.21 | 63.95 | 55.07 |
| N. Fk. Sun River | Willow Cr. | 32.30 | 22.87 | 26.68 | 24.10 | 12.47 |
| Marias | Tiber Res. | 1,316.00 | - | 28.22 | - | - |
| Birch Creek | Swift | 30.00 | 19.85 | 20.99 | 24.48 | 18.23 |
| Dupuyer & Birch | Lake Francis | 112.00 | 89.96 | 92.46 | 95.31 | 72.53 |
| Judith River | Ackley Lake | 5.82 | - | 4.15 | 4.58 | 4.24 |
| Missouri River | Ft. Peck | 19,000.00 | 5,514.0 | 4,677.0 | 9,314.0 | 9,904.26 |
| Milk River | Fresno | 127.20 | 80.24 | 69.55 | 77.22 | 55.81 |
| Milk River | Nelson | 66.80 | 55.10 | 41.39 | 50.64 | 29.57 |
| W. Rosebud Cr. | Mystic Lake | 20.80 | 10.62 | 9.48 | 7.89 | 11.09 |
| Red Lodge Cr. | Cooney | 27.50 | - | - | - | 9.56 * |
| Tongue River | Tongue River | 73.90 | - | - | 7.00 | 8.18 * |
| Swiftcurrent Cr. | Sherburne Lake | 66.10 | 15.00 | 19.05 | 16.98 | 17.27 |
| <u>MISSOURI RIVER BASIN - WYOMING</u> | | | | | | |
| Shoshone River | Buffalo Bill | 440.00 | 173.0 | 139.7 | 145.8 | 270.8 |
| Wind River | Boysen | 408.60 | 271.8 | 81.9 | 339.6 | - |
| Wind River | Pilot Butte | 31.6 | 9.1 | 11.7 | 9.2 | 12.88 |
| Bull Creek | Bull Lake | 152.00 | 84.9 | 72.6 | 66.3 | 63.64 * |
| Belle Fourche | Key Hole | 190.00 | 11.3 | 18.1 | - | - |
| <u>MISSOURI RIVER BASIN - NORTH DAKOTA</u> | | | | | | |
| Heart River | Heart Butte | 54.80 | 44.9 | 46.8 | 51.8 | 43.5 * |
| Heart River | Dickerson | 4.30 | 3.2 | 3.0 | 2.5 | 3.97 * |
| Missouri River | Garrison Lk | 13,805.00 | 595.0 | 524.0 | 239.0 | - |
| <u>MISSOURI RIVER BASIN - SOUTH DAKOTA</u> | | | | | | |
| Belle Fourche | Belle Fourche | 185.00 | 23.0 | 69.8 | - | - |
| Cheyenne River | Angostura | 160.00 | 23.9 | 77.2 | - | - |
| Cheyenne River | Deerfield | 15.1 | 7.7 | 9.7 | - | - |
| Grand River | Shadehill | 84.00 | 76.4 | 71.0 | - | - |
| Missouri River | Ft. Randall | 2,401.60 | 552.7 | 1,629.1 | - | - |

*Average is for less than 15 years of record in the 1938-52 period.

STATUS OF RESERVOIR STORAGE
 COLUMBIA RIVER IN MONTANA
 January, 1957

| BASIN & STREAM | RESERVOIR | USABLE CAPACITY 1000's AF | THOUSAND ACRE FEET IN STORAGE | | | 15-Yr.Avg. 1938-52 |
|-----------------------------|----------------|---------------------------------|-------------------------------|-----------|---------|-----------------------|
| | | | ABOUT JANUARY FIRST 1957 | 1956 | 1955 | |
| <u>COLUMBIA RIVER BASIN</u> | | | | | | |
| Flint Creek | Georgetown Lk | 31.00 | 22.75 | 23.77 | 24.38 | 23.49 |
| S. Fk. Flathead <u>5/</u> | Hungry Horse | 3,500.00 | 2,538.0 | 3,029.0 | 2,701.0 | 1,426.9 * |
| Flathead River | Flathead Lk | 1,791.00 | 1,126.0 | 925.5 | 1,109.0 | 935.0 |
| Flathead River <u>6/</u> | Camas Res. | 42.80 | 29.04 | 33.80 | 38.10 | 17.12 * |
| Flathead River <u>7/</u> | Mission Valley | 98.60 | 24.15 | 28.64 | 54.55 | 32.45 * |
| Jocko Creek | Lower Jocko Lk | 7.6 | .505 | Snowbound | | |

5/ 4-year average

6/ Camas Reservoirs are shown as a sum of (4) small reservoirs on the west side of Flathead Lake located on Dry Creek and Little Bitterroot River.

7/ Mission Valley Reservoirs are shown as a sum of (8) small reservoirs located south and east of Flathead Lake. Both Camas and Mission Valley reservoirs are operated by the Indian Irrigation Service.

* Average is for less than 15 years of record in the 1938-52 period.

